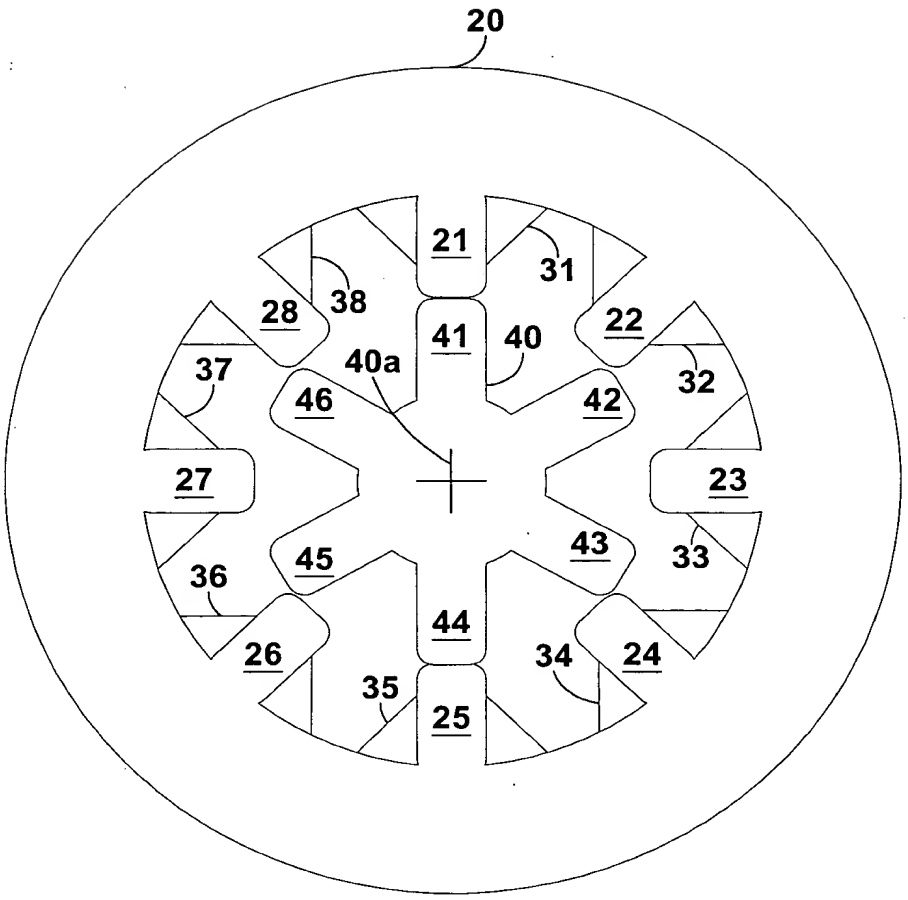


PHASE A ALIGNED	PHASE B MISALIGNED
PHASE C UNALIGNED	PHASE D MISALIGNED

FIG. 1A
(PRIOR ART)

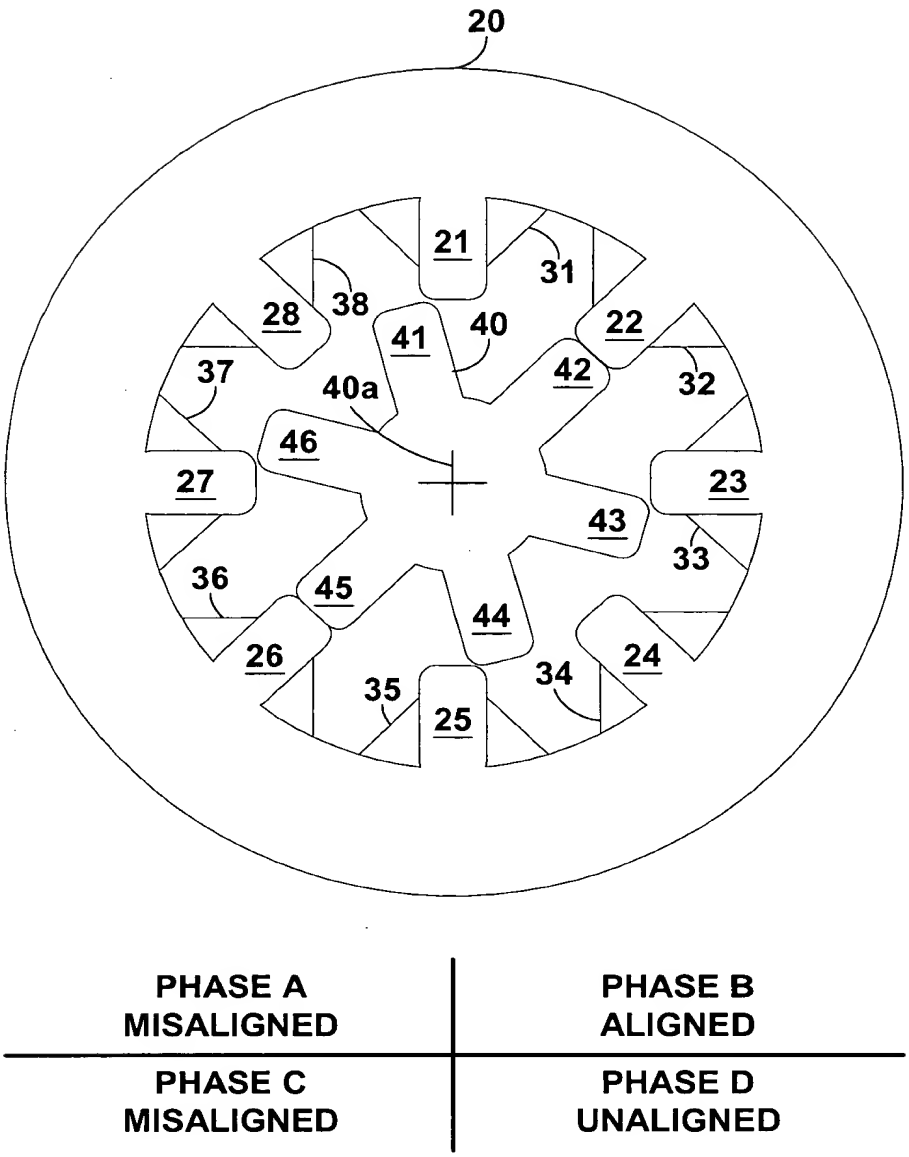


FIG. 1B
(PRIOR ART)

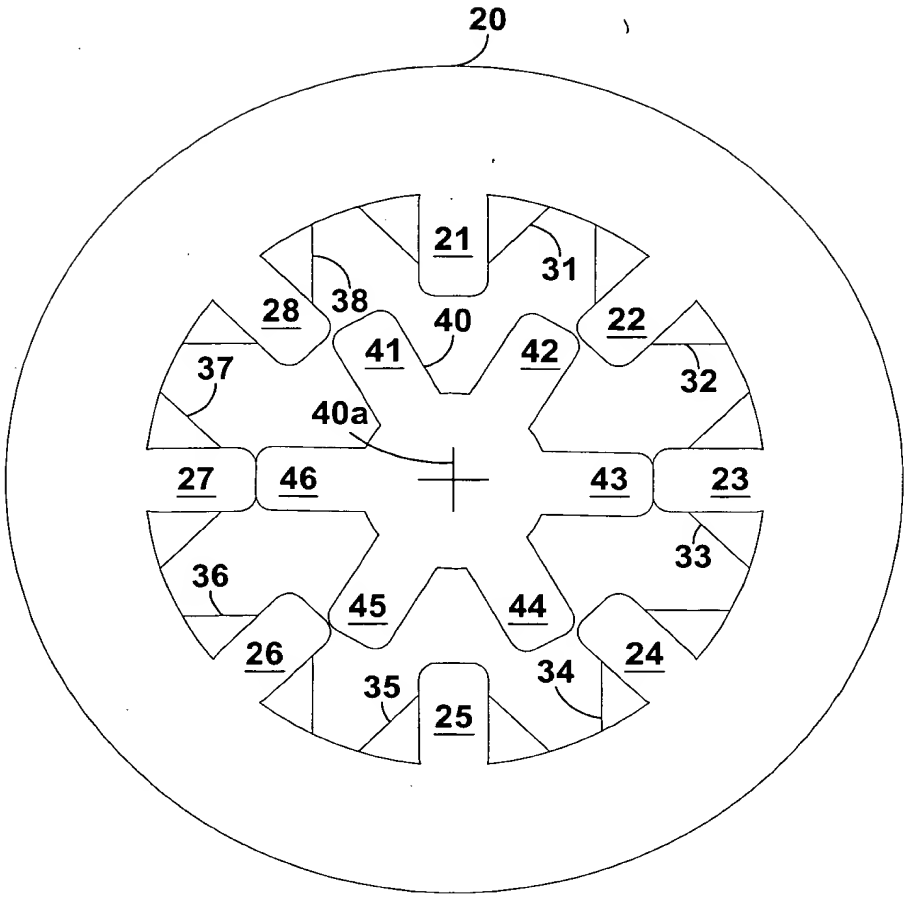
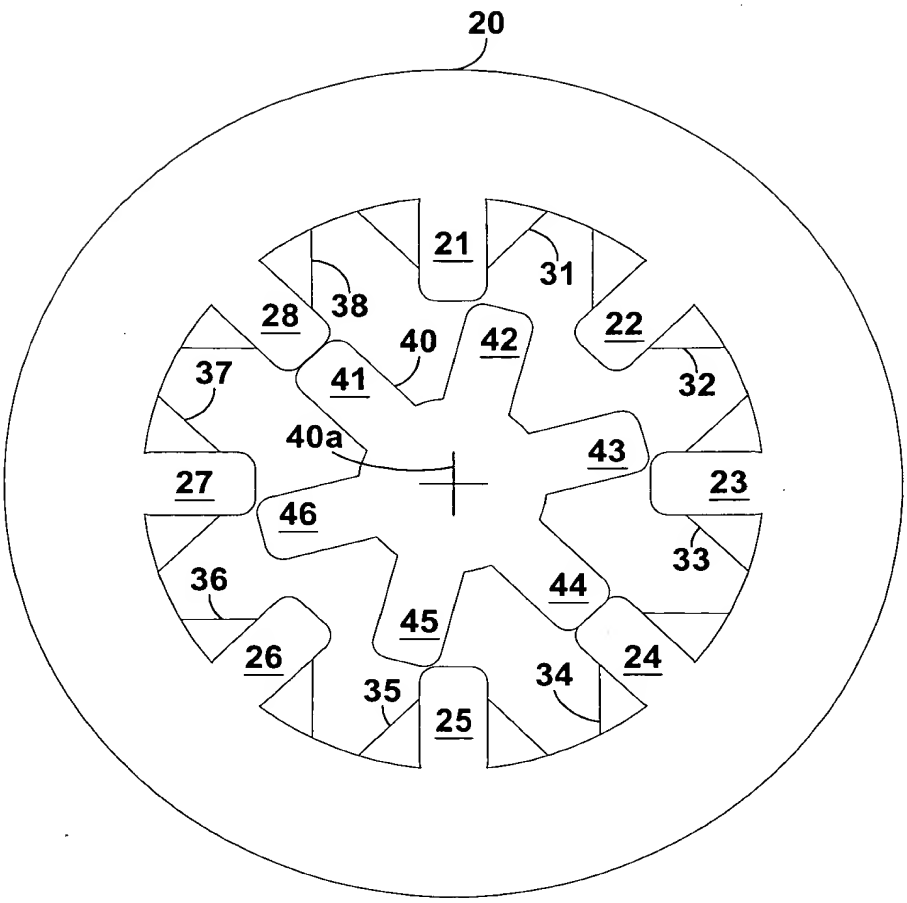


FIG. 1C
(PRIOR ART)



PHASE A MISALIGNED	PHASE B UNALIGNED
PHASE C MISALIGNED	PHASE D ALIGNED

FIG. 1D
(PRIOR ART)

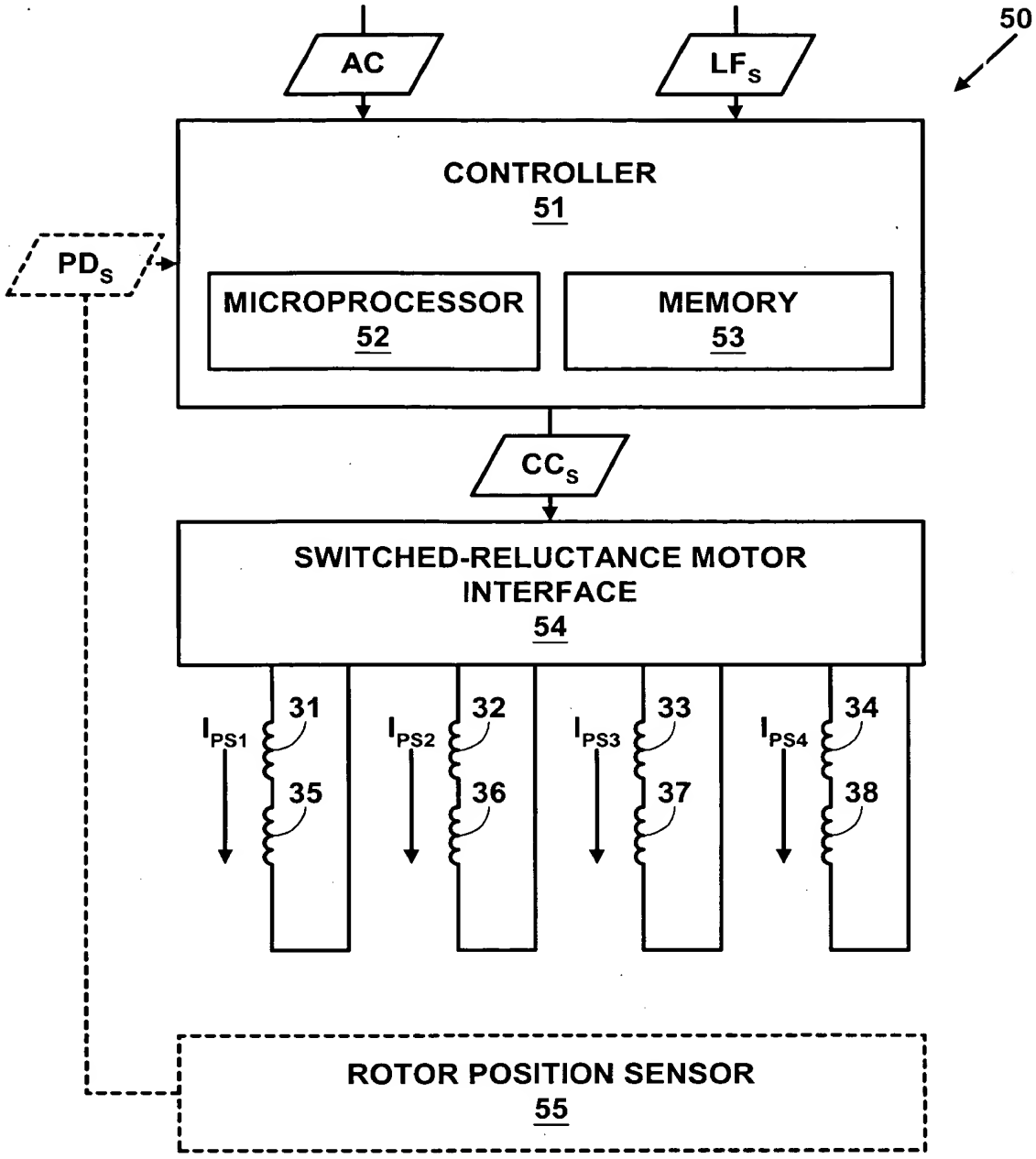

50
AC
LF$_S$
CONTROLLER
51
PD$_S$
MICROPROCESSOR
52
MEMORY
53
CC$_S$
SWITCHED-RELUCTANCE MOTOR
INTERFACE
54
I$_{PS1}$
31
35
I$_{PS2}$
32
36
I$_{PS3}$
33
37
I$_{PS4}$
34
38
ROTOR POSITION SENSOR
55

FIG. 2

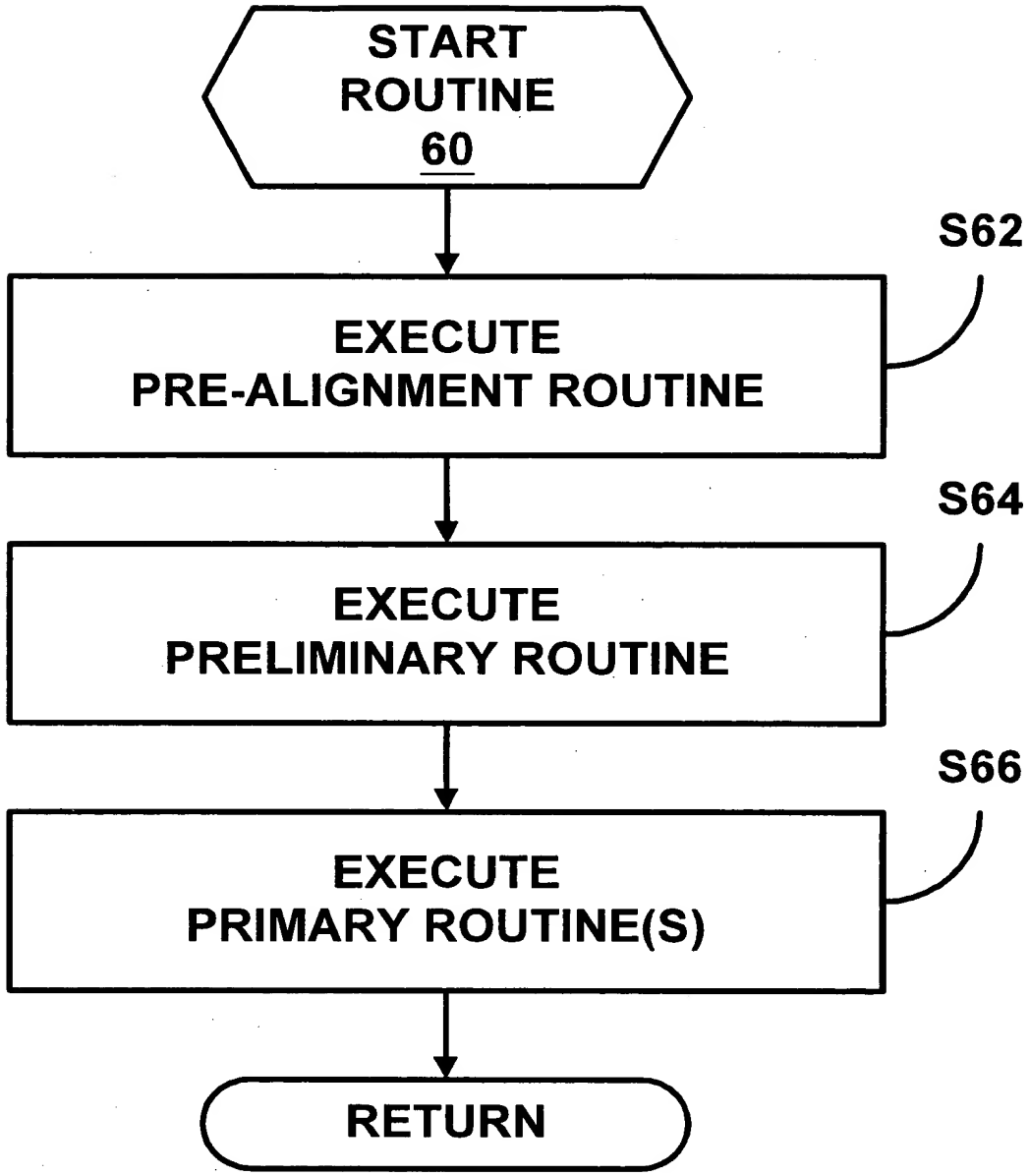

START
ROUTINE
60
S62
EXECUTE
PRE-ALIGNMENT ROUTINE
S64
EXECUTE
PRELIMINARY ROUTINE
S66
EXECUTE
PRIMARY ROUTINE(S)
RETURN

FIG. 3

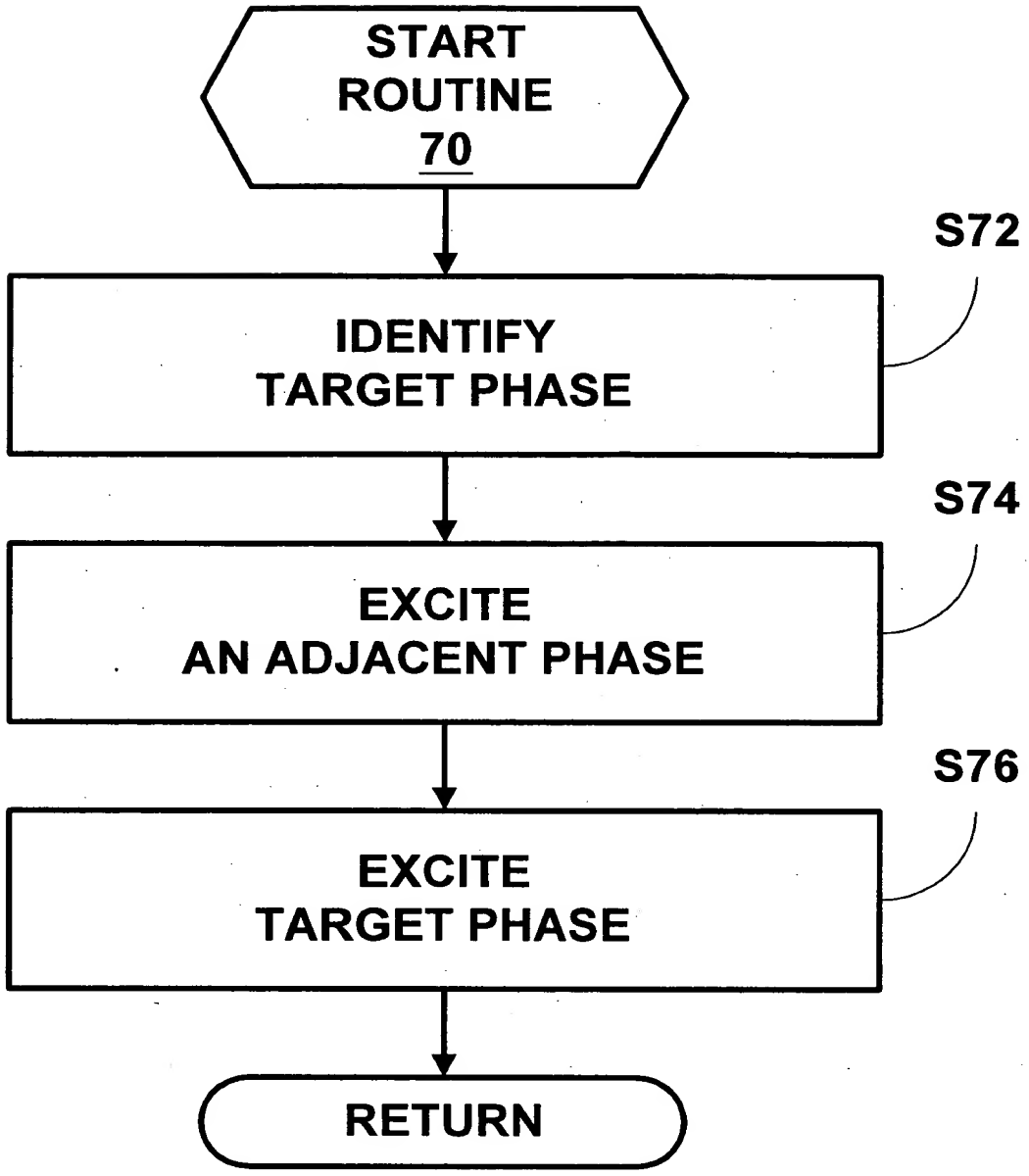

START
ROUTINE
70
S72
IDENTIFY
TARGET PHASE
S74
EXCITE
AN ADJACENT PHASE
S76
EXCITE
TARGET PHASE
RETURN

FIG. 4A

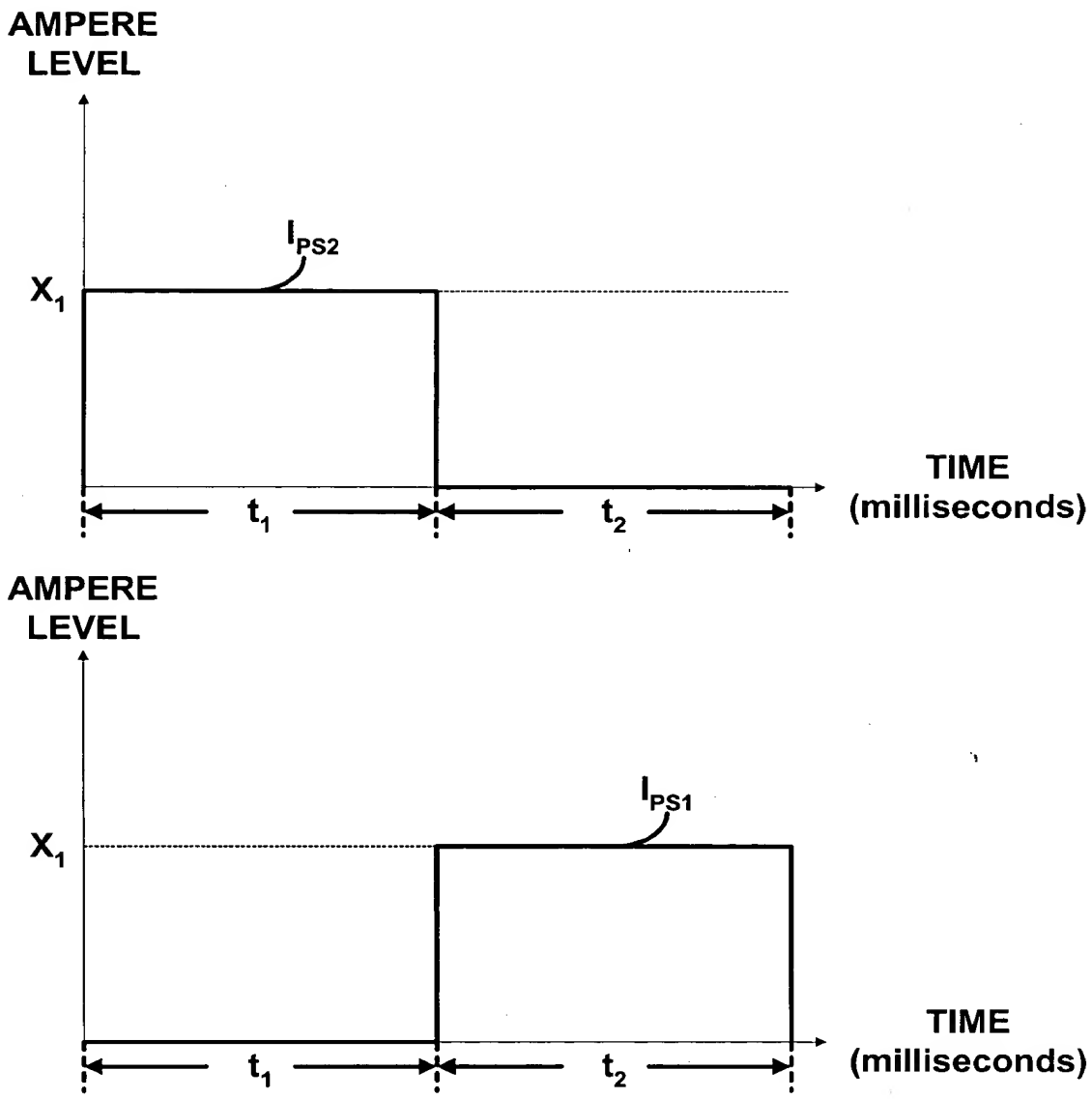

AMPERE
LEVEL
I_{PS2}
X_1
TIME
(milliseconds)
t_1
t_2
AMPERE
LEVEL
I_{PS1}
X_1
TIME
(milliseconds)
t_1
t_2

FIG. 4B

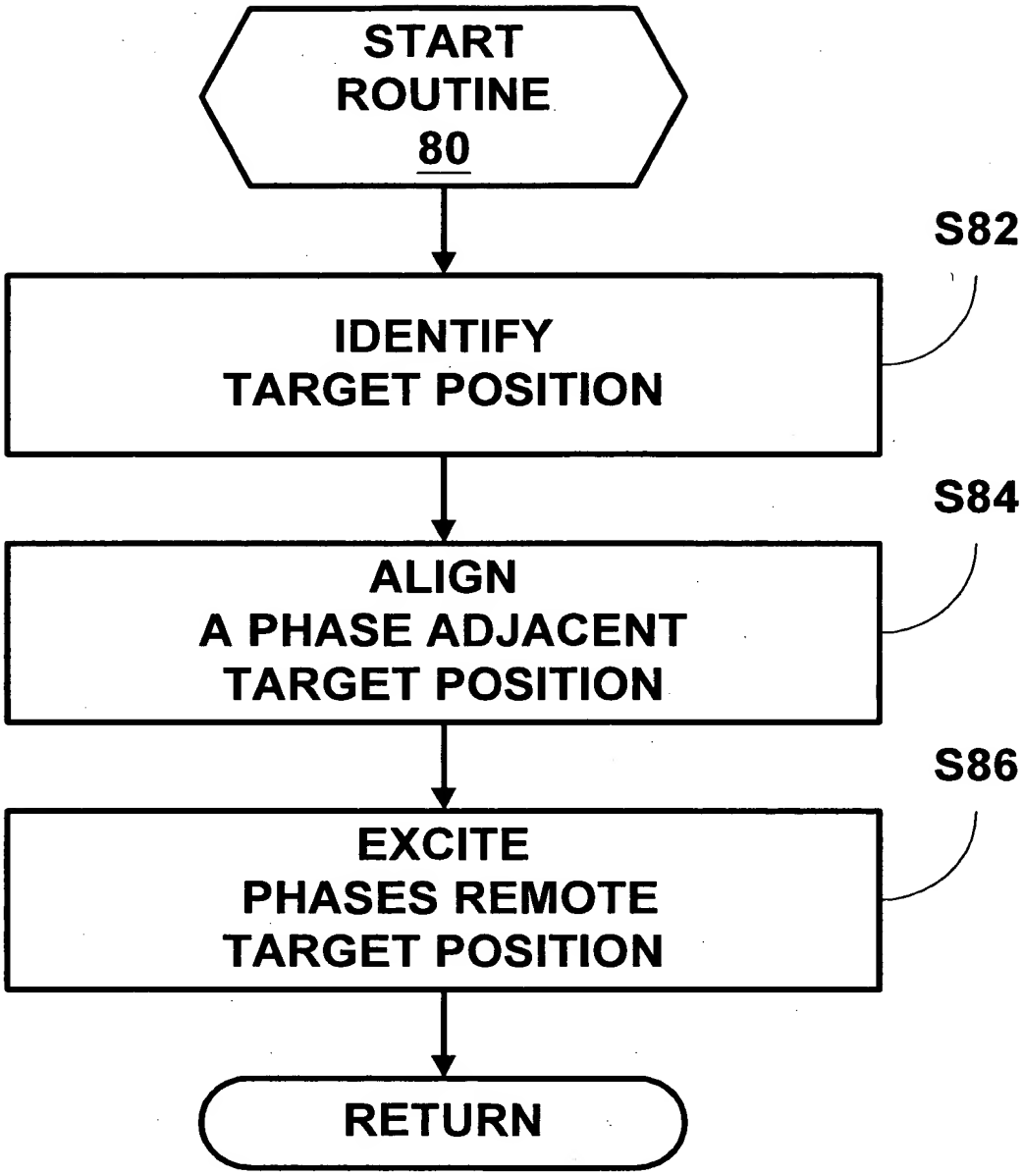

START
ROUTINE
80
S82
IDENTIFY
TARGET POSITION
S84
ALIGN
A PHASE ADJACENT
TARGET POSITION
S86
EXCITE
PHASES REMOTE
TARGET POSITION
RETURN

FIG. 5A

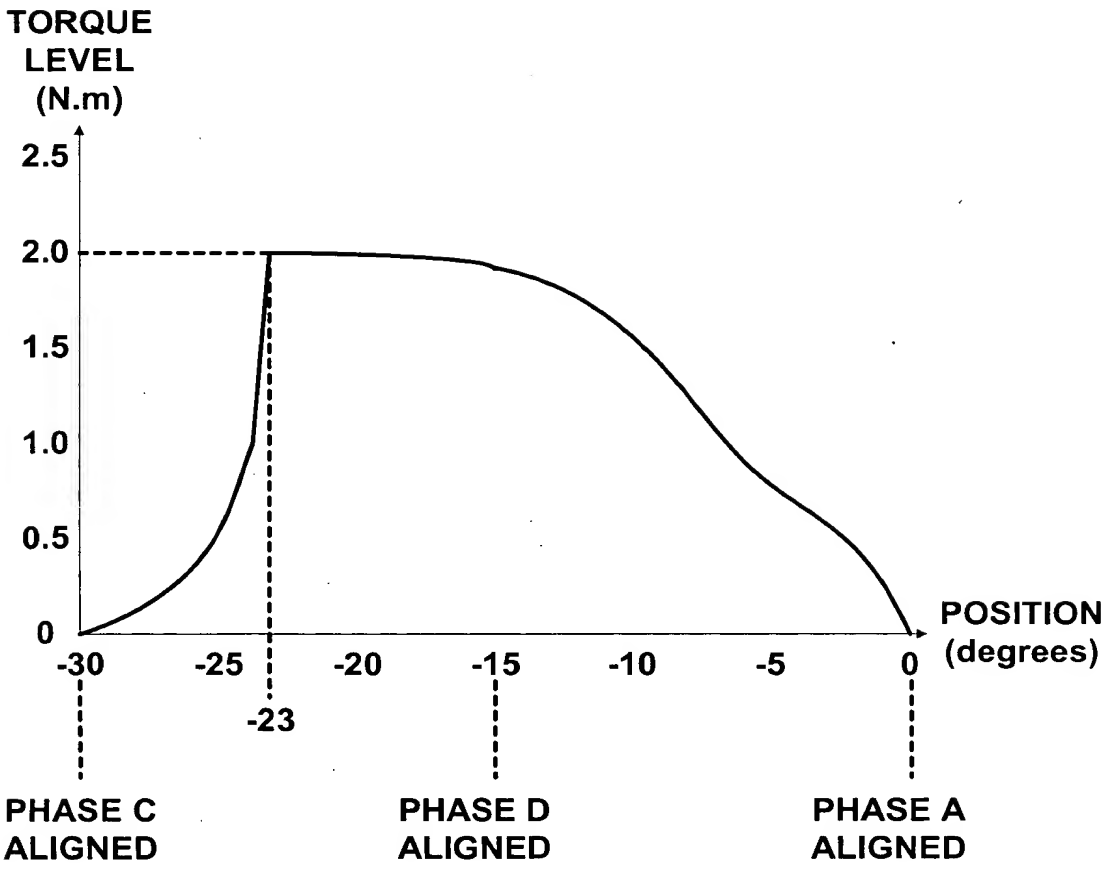

TORQUE
LEVEL
(N.m)
2.5
2.0
1.5
1.0
0.5
0
-30
-25
-23
-20
-15
-10
-5
0
POSITION
(degrees)
PHASE C
ALIGNED
PHASE D
ALIGNED
PHASE A
ALIGNED

FIG. 5B

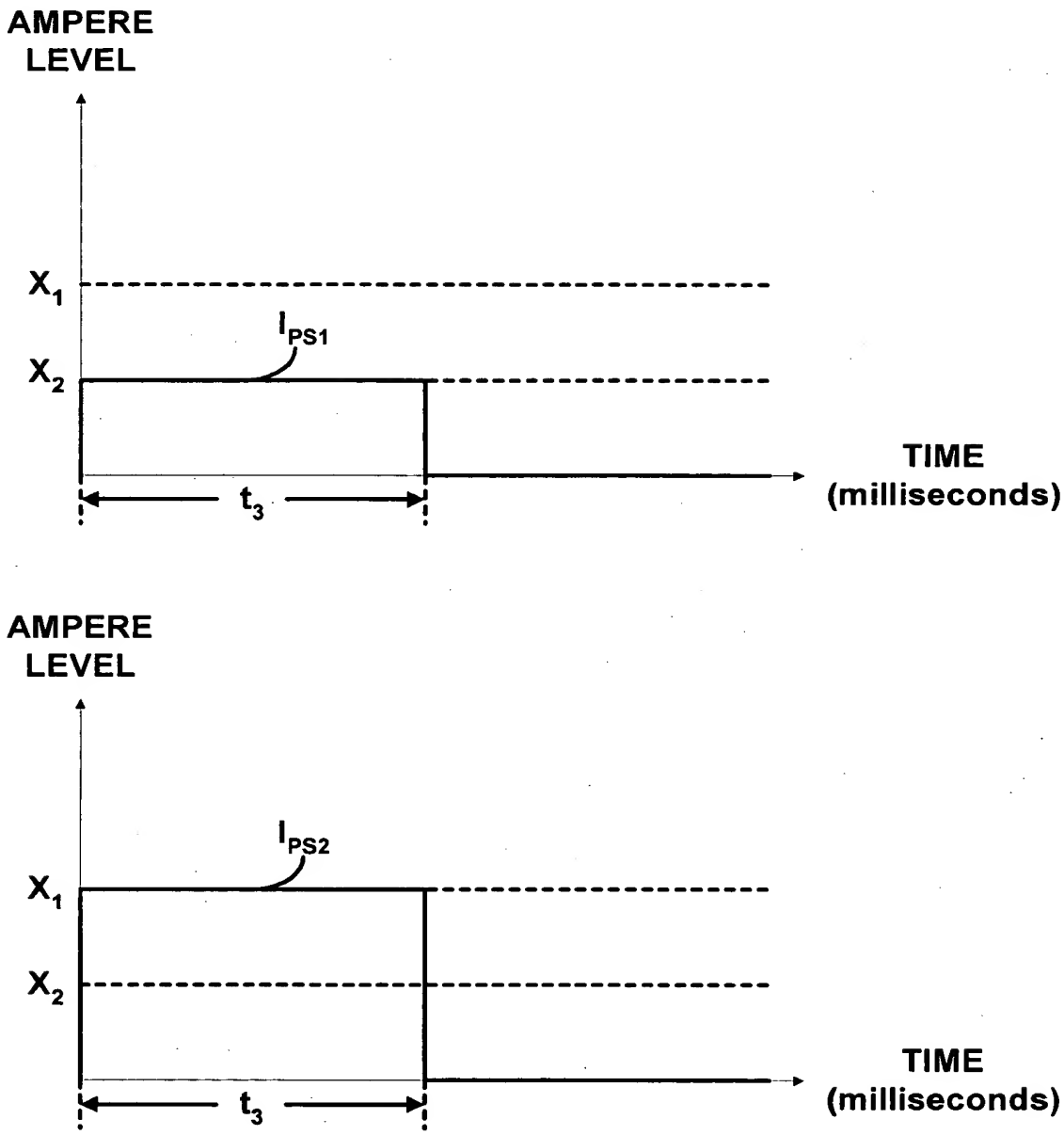

AMPERE
LEVEL
X1
X2
IPS1
t3
TIME
(milliseconds)
AMPERE
LEVEL
IPS2
X1
X2
t3
TIME
(milliseconds)

FIG. 5C

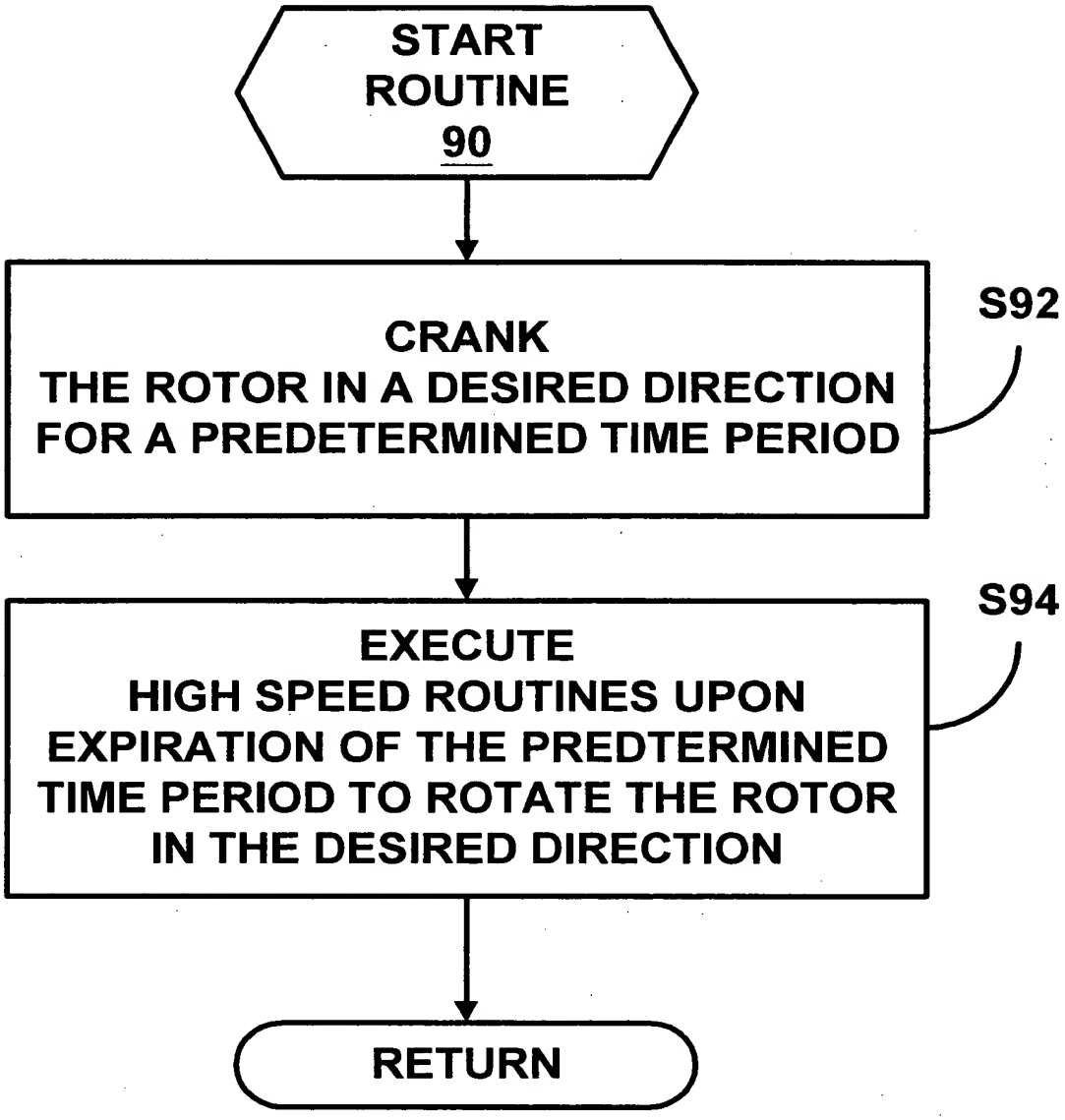

START
ROUTINE
90
CRANK
THE ROTOR IN A DESIRED DIRECTION
FOR A PREDETERMINED TIME PERIOD
S92
EXECUTE
HIGH SPEED ROUTINES UPON
EXPIRATION OF THE PREDTERMINED
TIME PERIOD TO ROTATE THE ROTOR
IN THE DESIRED DIRECTION
S94
RETURN

FIG. 6A

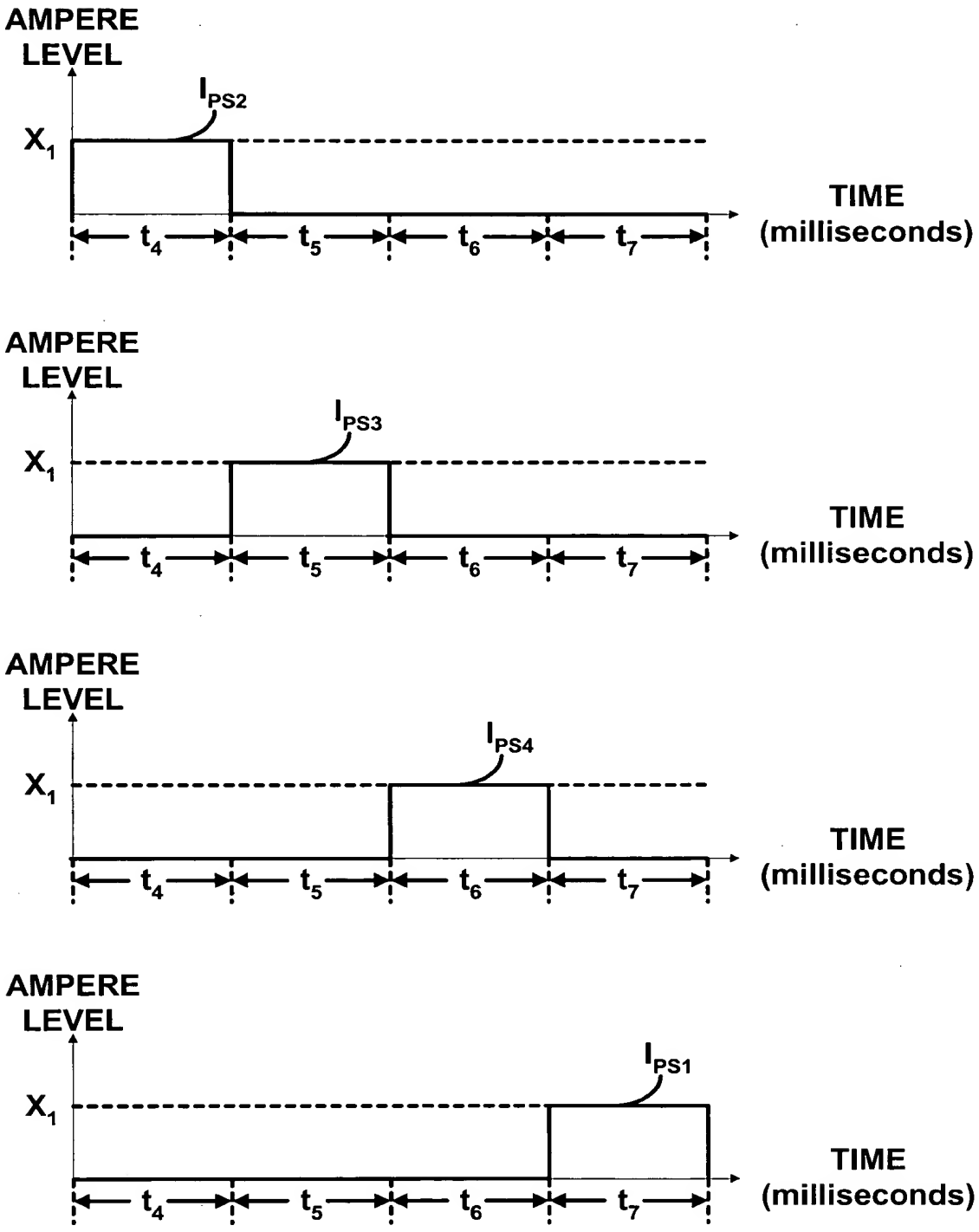

AMPERE LEVEL
I_{PS2}
X_1
t_4
t_5
t_6
t_7
TIME (milliseconds)
AMPERE LEVEL
I_{PS3}
X_1
t_4
t_5
t_6
t_7
TIME (milliseconds)
AMPERE LEVEL
I_{PS4}
X_1
t_4
t_5
t_6
t_7
TIME (milliseconds)
AMPERE LEVEL
I_{PS1}
X_1
t_4
t_5
t_6
t_7
TIME (milliseconds)

FIG. 6B

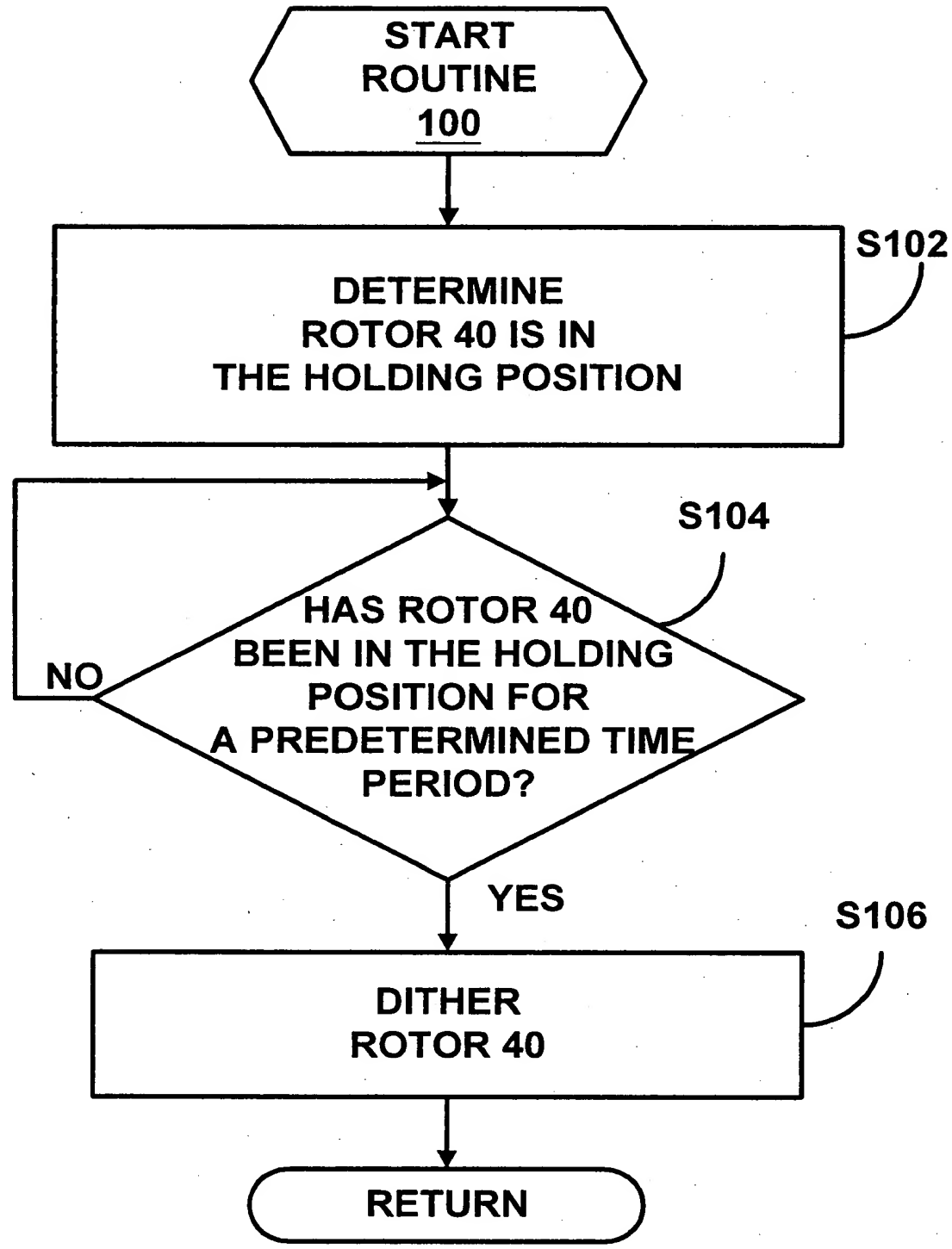

START
ROUTINE
100
S102
DETERMINE
ROTOR 40 IS IN
THE HOLDING POSITION
S104
HAS ROTOR 40
BEEN IN THE HOLDING
POSITION FOR
A PREDETERMINED TIME
PERIOD?
NO
YES
S106
DITHER
ROTOR 40
RETURN

FIG. 7A

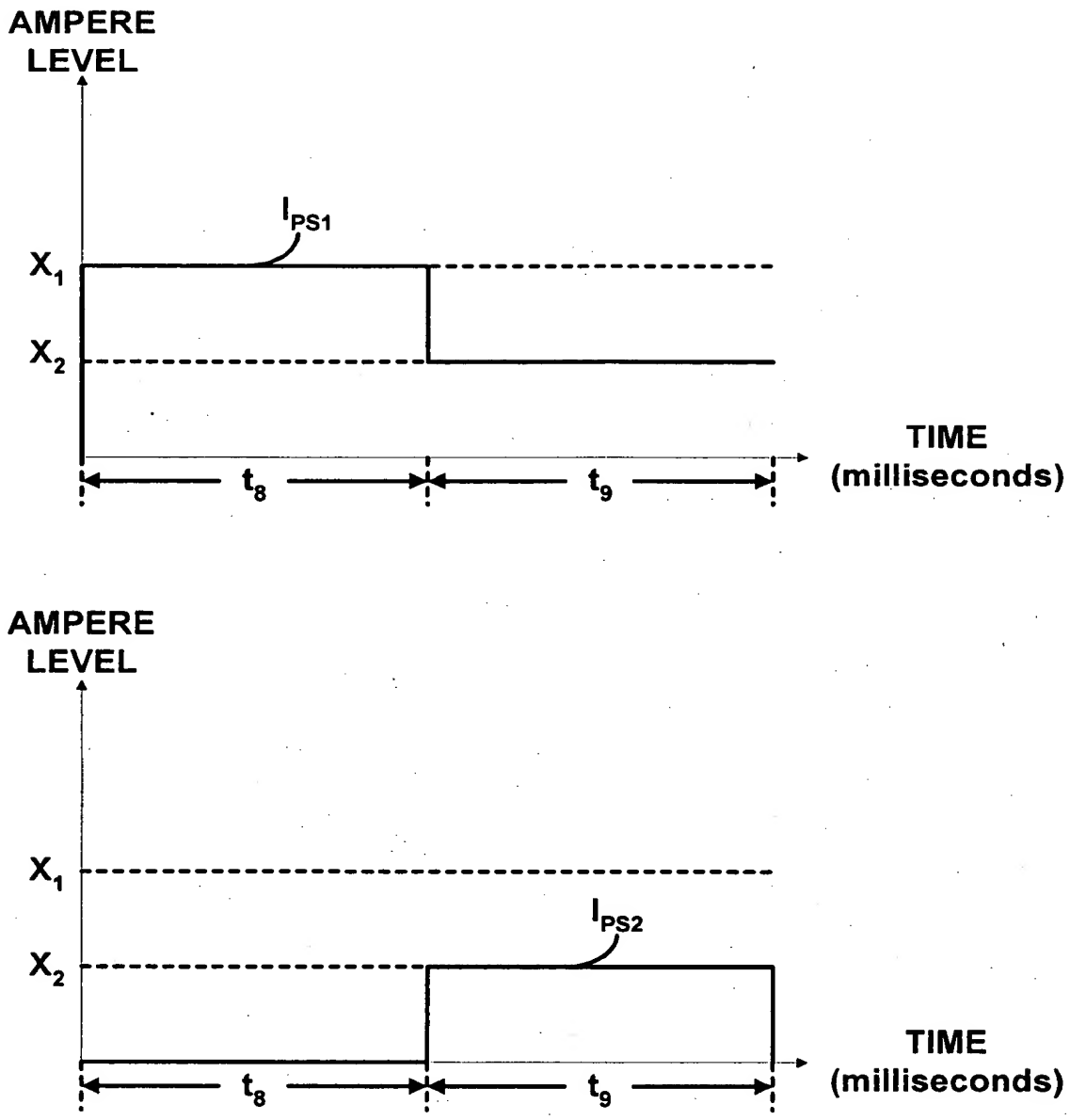

AMPERE
LEVEL
I_{PS1}
X_1
X_2
TIME
(milliseconds)
t_8
t_9
AMPERE
LEVEL
X_1
I_{PS2}
X_2
TIME
(milliseconds)
t_8
t_9

FIG. 7B

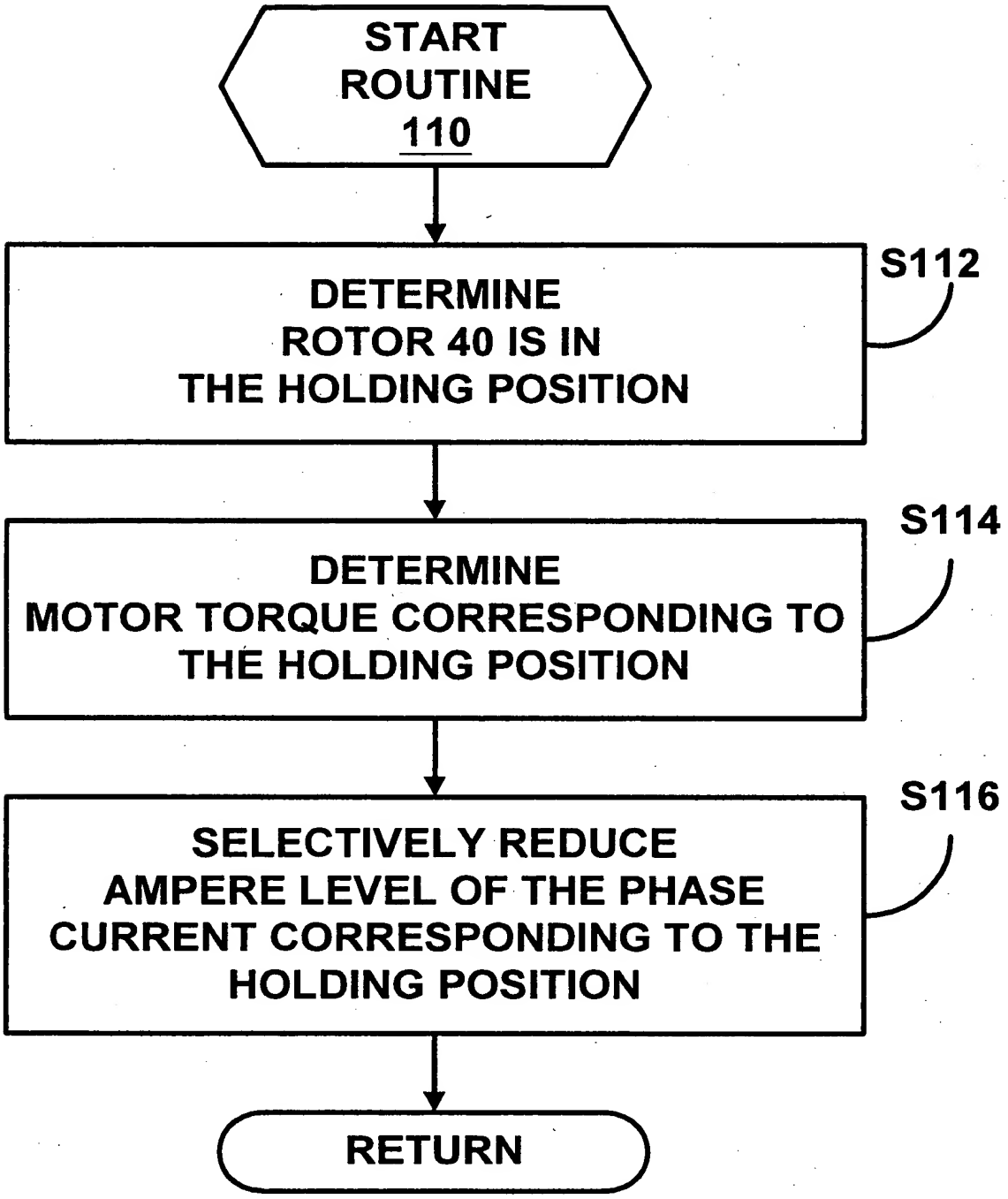

START
ROUTINE
110
DETERMINE
ROTOR 40 IS IN
THE HOLDING POSITION
S112
DETERMINE
MOTOR TORQUE CORRESPONDING TO
THE HOLDING POSITION
S114
SELECTIVELY REDUCE
AMPERE LEVEL OF THE PHASE
CURRENT CORRESPONDING TO THE
HOLDING POSITION
S116
RETURN

FIG. 8A

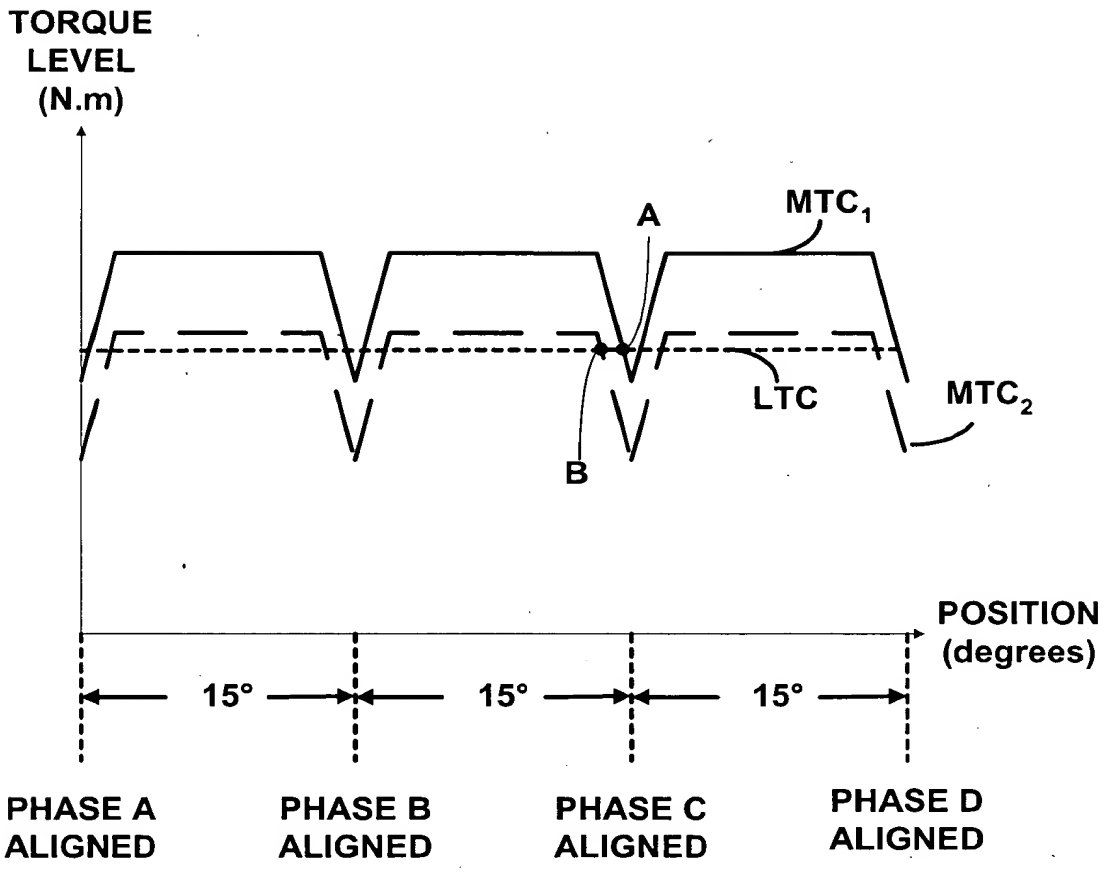

TORQUE
LEVEL
(N.m)
A
MTC1
LTC
MTC2
B
POSITION
(degrees)
15°
15°
15°
PHASE A
ALIGNED
PHASE B
ALIGNED
PHASE C
ALIGNED
PHASE D
ALIGNED

FIG. 8B

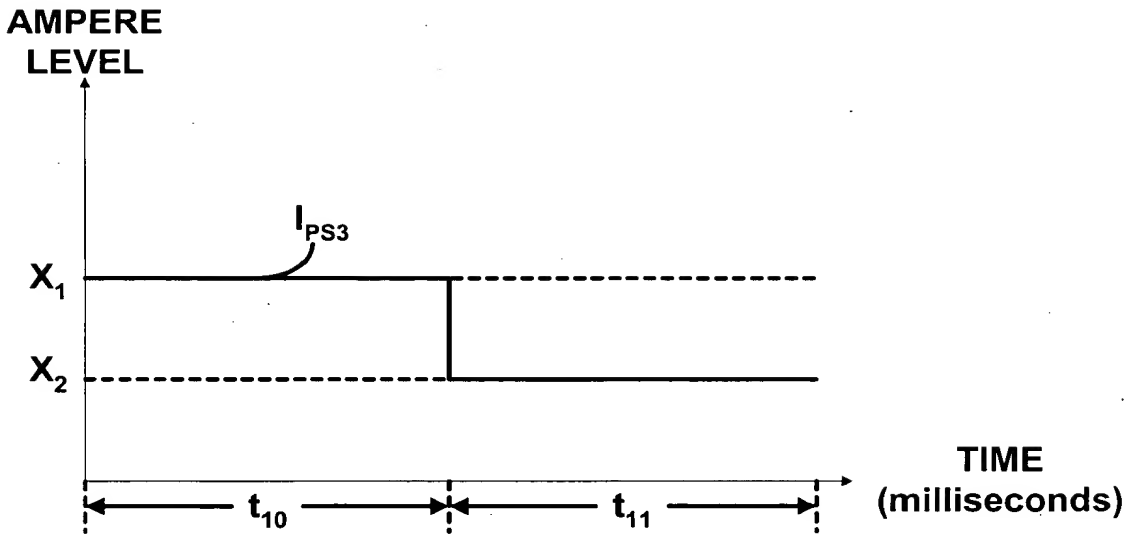


FIG. 8C